

--In the client program 111, the received data is converted into the program data 122 of the client program language-specific format by an unmarshalling part 121 of the ORB 141 and the cache registering part 151 registers the result of the conversion into the cache 131. At this time, if all or a part of the response communication data 120 exists in a cache 131, the data is converted into the program data 122 by using the cache data. In this manner, the data transmission and reception can be performed between the distributed client and server programs at a high speed.--

IN THE CLAIMS

Please amend the claims as follows:

Please the claims as follows:

1. (Amended) An apparatus for converting data of a first data format used on a particular computer into data of a second data format which is common to a plurality of computers in a distributed computing environment, comprising:
a caching part for storing data of the first data format and corresponding data of the second data format and correspondence between the data of the first data format and the corresponding data of the second data format;

a marshalling part for discriminating whether at least a part of the data of the first data format to be converted has been stored in said caching part or not, for converting said data of the first data format to be converted into the data of the second format by using the correspondence stored in said caching part such that; for a part or whole of said data of the first format to be converted that matches the data of the first format stored in said caching part, conversion is made by using the

correspondence and that; for another part of said data of the first format to be converted that does not match the data of the first format stored in said caching part, conversion is made with or without using said caching part depending upon a data type of said unmatched part of the data of the first data format; and

a cache registering part for registering said converted data into said caching part.

2. (Amended) An apparatus for converting data of a second data format which is common to a plurality of computers into data of a first data format used on a particular computer in a distributed computing environment, comprising:

a caching part for storing data of the second format and corresponding data of the first format and correspondence between the data of the second format and the corresponding data of the first format;

an unmarshalling part for discriminating whether at least a part of the data of the second data format to be converted has been stored in said caching part or not, for converting said data of the second data format to be converted into the data of the first data format by using the correspondence stored in said caching part such that; for a part or whole of said data of the second format to be converted that matches the data of the second format stored in said caching part, conversion is made by using the correspondence and that; for another part of said data of the second format to be converted that does not match the data of the second format stored in said caching part, conversion is made with or without using said caching part depending upon a data type of said unmatched part of the data of the second data format; and

a cache registering part for registering said converted data of the first data format into said caching part.

3. (Amended) A method of converting client program data of a client program into request communication data common to a plurality of program languages or computers in order to request a processing task from said client program to a server program on a server in a distributed computing environment, comprising the steps of:

discriminating whether at least a part of said client program data exists in a cache of said client program or not by referring to said cache, said cache storing client program data and corresponding request communication data and correspondence between the client program data and the request communication data;

converting said client program data into said request communication data by using the correspondence stored in said cache such that; for a part or whole of the client program data to be converted that matches the client program data stored in said cache, conversion is made by using the correspondence and that; for another part of said data of the client program data to be converted that does not match the client program data stored in said cache, conversion is made with or without using said cache depending upon a data type of said unmatched part of the data of the client program data;

storing the request communication data into said cache as a conversion result when said data does not exist; and

transmitting said converted requesting communication data to said server

program.

4. (Amended) A method of converting request communication data which is transmitted from a client and is common to a plurality of program languages or computers into program data of a program language describing a server program which operates on a server in a distributed computing environment and processing a processing task requested by the client, comprising the steps of:

receiving said request communication data by an unmarshalling part in said server;

discriminating whether at least a part of said request communication data exists in a cache of said server program or not by referring to said cache, said cache storing the request communication data and corresponding program data and correspondence between the request communication data and the program data;

converting said received requesting communication data into the program data of the program language describing said server program by using the correspondence stored in said cache such that; for a part or whole of the request communication data to be converted that matches the request communication data stored in said cache, conversion is made by using the correspondence and that; for another part of said data of the request communication data to be converted that does not match the request communication data stored in said cache, conversion is made with or without using said cache depending upon a data type of said unmatched part of the data of the request communication data;

storing the program data into said cache as a conversion result when said data does not exist; and

processing the processing task requested by said client on the basis of said converted program data.

6. (Amended) A method whereby a client program receives and processes response communication data which is transmitted from a server and is common to a plurality of computers or program languages in a distributed computing environment, comprising the steps of:

receiving said response communication data by said client program;
discriminating whether at least a part of said response communication data exists in a cache of said client program or not by referring to said cache, said cache storing response communication data and corresponding client program data and correspondence between the response communication data and the client program data;

converting said received response communication data into client program data by using the correspondence stored in said cache such that; for a part or whole of the response communication data to be converted that matches the response communication data stored in said cache, conversion is made by using the correspondence and that; for another part of said data of the response communication data to be converted that does not match the response communication data stored in said cache, conversion is made with or without using said cache depending upon a data type of said unmatched part of the data of the response communication data; and

storing the client program data into said cache as a conversion result when said data does not exist.

7. (Amended) A computer software product including a computer-readable medium having a computer readable program embodied in the medium for making program data to be transmitted subject to a marshalling process to generate request communication data, said medium having stored thereon:

a program code portion for comparing said program data to be transmitted with program data on a cache, said cache storing a pair of contents of said program data and contents of communication data corresponding thereto for every type of the program data;

a program code portion for, when the contents of said program data to be transmitted and the contents of the program data on said cache are matched, comparing subsequent program data to be transmitted with said program data on said cache until a difference is detected;

a program code portion for copying the communication data on said cache corresponding to the program data which is matched until said difference is detected into request communication data;

a program code portion for, when a difference is detected between contents of certain program data to be transmitted and contents of the program data on the cache, forming corresponding communication data from the program data in which said difference is detected in accordance with a type of the program data in which said difference is detected;

a program code portion for storing a correspondence between the program data in which said difference is detected and said formed communication data onto said cache; and

a program code portion for, when there is no transmission program data to be compared, copying the formed communication data remaining on said cache into said request communication data.

10. (Amended) A computer software product including a computer-readable medium having a computer readable program embodied in said medium for making received request communication data subject to an unmarshalling process to generate output program data, said medium having stored thereon:

a program code portion for comparing said received request communication data with communication data on a cache in units of a predetermined communication data length, said cache storing a pair of contents of said received request communication data and contents of the communication data corresponding thereto for every type of the received request communication data;

a program code portion for, when the contents of said received request communication data and the contents of the communication data on said cache are identical, comparing subsequent received request communication data with said communication data on said cache until a difference is detected;

a program code portion for copying the communication data on said cache corresponding to the received request communication data which is matched until said difference is detected into said output program data;

a program code portion for, when a difference is detected between contents of certain received request communication data and contents of the communication data on the cache, forming corresponding program data from said received request communication data in which said difference is detected in accordance with a type of

said received request communication data;

 a program code portion for storing a correspondence between said received request communication data in which said difference is detected and said formed corresponding program data onto said cache; and

 a program code portion for, when there is no received request communication data to be compared, copying the formed corresponding program data remaining on said cache into said output program data.